

WHAT IS CLAIMED IS:

1. A memory device comprising:

a memory cell with a capacitor including a first electrode, a ferroelectric film and a second electrode, which are formed in this order over a substrate,

5 wherein the ferroelectric film is selectively grown on the first electrode.

2. The memory device of claim 1, wherein the ferroelectric film is made of a single crystal or a single domain.

10 3. The memory device of claim 1, wherein the ferroelectric film is grown to be self-organized by physical or chemical interaction between the ferroelectric film and the first electrode.

4. The memory device of claim 3, wherein the ferroelectric film is grown in a vapor phase or in a liquid phase.
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5. The memory device of claim 1, wherein the capacitor is connected to a selective switching device.

20 6. The memory device of claim 5, wherein the selective switching device is formed on the substrate or between the substrate and the first electrode.

7. The memory device of claim 5, wherein the selective switching device is a transistor or a bidirectional diode.

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8. A memory device, comprising:

a first capacitor array layer including a plurality of capacitors each including a first electrode, a first ferroelectric film and a second electrode which are formed in this order over a substrate; and

5 a second capacitor array layer including a plurality of capacitors each including a third electrode, a second ferroelectric film and a fourth electrode which are formed in this order as viewed from the substrate, the second capacitor array layer being formed over the first capacitor array layer with an insulating film interposed between the first and second capacitor array layers,

10 wherein the first ferroelectric film is selectively grown on the first electrode, and the second ferroelectric film is selectively grown on the third electrode.

9. The memory device of claim 8, wherein each of the first and second ferroelectric films is made of a single crystal or a single domain.

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10. The memory device of claim 8, wherein the first ferroelectric film is grown to be self-organized by physical or chemical interaction between the first ferroelectric film and the first electrode, and

the second ferroelectric film is grown to be self-organized by physical or chemical
20 interaction between the second ferroelectric film and the third electrode.

11. The memory device of claim 8, wherein each of the first and second ferroelectric films is grown in a vapor phase or in a liquid phase.

25 12. The memory device of claim 8, wherein the capacitors constituting the first and

second capacitor array layers are respectively connected to selective switching devices, thereby forming respective memory cells.

13. The memory device of claim 12, wherein each of the selective switching
5 devices is formed on the substrate or between the substrate and the third electrode.

14. The memory device of claim 12, wherein the selective switching devices are transistors or bidirectional diodes.

10 15. The memory device of claim 12, wherein the selective switching devices respectively connected to the capacitors constituting the second capacitor array layer are formed in the second capacitor array layer.

16. The memory device of claim 12, wherein the selective switching devices
15 formed in the second capacitor array layer are thin film transistors or bidirectional diodes.

17. The memory device of claim 12, wherein means for electrically connecting the memory cells included in the second capacitor array layer to one another is provided between the first and second capacitor array layers or on the second capacitor array layer.
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18. The memory device of claim 12, wherein means for electrically connecting the memory cells included in the first capacitor array layer to the memory cells included in the second capacitor array layer is provided between the first and second capacitor array layers.
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